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IN THE CLAIMS:

- 1. An apparatus to measure micro-forces, comprising:
- a cantilever palette including a plurality of cantilever array blocks, each

 cantilever array block including a plurality of cantilevers, each cantilever including a
 plurality of cantilever fingers surrounded by a frame with frame fingers, said
 cantilever fingers and said frame fingers forming a diffraction grating, each cantilever
 array block being configured to be responsive to a predetermined micro-force, such
 that cantilevers of said cantilever array block deflect in the presence of said

 predetermined micro-force causing said diffraction grating to diffract light and thereby
 provide visual indicia of the presence of said predetermined micro-force.
 - 2. The apparatus of claim 1 wherein said predetermined micro-force is a chemical-mechanical force created by the presence of a predetermined substance.
 - 3. The apparatus of claim 2_wherein said predetermined micro-force is a chemical-mechanical force created by the presence of a predetermined chemical.
- 4. The apparatus of claim 1 wherein said predetermined micro-force is a chemical-mechanical force created by an antibody-antigen interaction.
 - 5. The apparatus of claim 2 wherein each cantilever array block of said plurality of cantilever array blocks is configured to be responsive to a different predetermined substance.
 - 6. The apparatus of claim 2 wherein each cantilever array block of said plurality of cantilever array blocks is configured to be responsive to a predetermined level of a single predetermined substance.
- The apparatus of claim 2 wherein said plurality of cantilever array blocks includes cantilever array block subsets, each cantilever array block subset being configured to be responsive to a different predetermined substance, and each cantilever

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array block within each cantilever array block subset being configured to be responsive to a predetermined level of said predetermined substance.

- 8. The apparatus of claim 1 wherein cantilever array blocks of said cantilever palette are configured to be responsive to a predetermined micro-force that is a thermal-mechanical micro-force arising from conduction, convection, or radiation.
 - 9. The apparatus of claim 1 wherein cantilever array blocks of said cantilever palette are configured to be responsive to a predetermined micro-force that is a magnetic micro-force.
 - 10. The apparatus of claim 1 wherein cantilever array blocks of said cantilever palette are configured to be responsive to a predetermined micro-force that is an electrostatic micro-force.
 - 11. The apparatus of claim 1 wherein cantilever array blocks of said cantilever palette are configured to be responsive to a predetermined micro-force that is a piezoelectric micro-force.
- 20 12. The apparatus of claim 1 further comprising image enhancement devices selected from the group consisting of: a beam splitter, a visible lens, and a spatial filter.
- 13. The apparatus of claim 1 further comprising a pin hole array attached to said25 cantilever palette.
- 14. A method of identifying micro-forces, said method comprising the steps of:
 forming a cantilever palette including a plurality of cantilever array blocks,
 each cantilever array block including a plurality of cantilevers, each cantilever
 including a plurality of cantilever fingers surrounded by a frame with frame fingers,
 said cantilever fingers and said frame fingers forming a diffraction grating, each

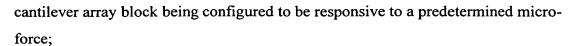
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exposing said cantilever palette to said predetermined micro-force, thereby causing cantilevers of said cantilever array block to deflect such that said diffraction grating produces diffracted light; and

visually observing said diffracted light from said diffraction grating to identify the presence of said predetermined micro-force.

- 15. The method of claim 14 wherein said forming step includes the step of forming said cantilever palette to be responsive to a predetermined micro-force that is a chemical-mechanical force created by the presence of a predetermined substance.
 - 16. The method of claim 15 wherein said forming step includes the step of forming each cantilever array block of said plurality of cantilever array blocks to be responsive to a different predetermined substance.
 - 17. The method of claim 15 wherein said forming step includes the step of forming each cantilever array block of said plurality of cantilever array blocks to be responsive to a predetermined level of a single predetermined substance.
 - 18. The method of claim 15 wherein said forming step includes the step of forming cantilever array block subsets, each cantilever array block subset being configured to be responsive to a different predetermined substance, and each cantilever array block within each cantilever array block subset being configured to be responsive to a predetermined level of said predetermined substance.
 - 19. The method of claim 14 wherein said forming step includes the step of forming said cantilever palette to be responsive to a predetermined micro-force that is a thermal micro-force.

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- 20. The method of claim 14 wherein said forming step includes the step of forming said cantilever palette to be responsive to a predetermined micro-force that is a magnetic micro-force.
- 5 21. The method of claim 14 wherein said forming step includes the step of forming said cantilever palette to be responsive to a predetermined micro-force that is an electrostatic micro-force.